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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,050	07/31/2001	Karthik Ramasubramanian	CR00257M	4250
22917	7590	12/13/2005	EXAMINER	
MOTOROLA, INC. 1303 EAST ALGONQUIN ROAD IL01/3RD SCHAUMBURG, IL 60196			TSE, YOUNG TOI	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/919,050	Applicant(s) RAMASUBRAMANIAN ET AL.	
	Examiner YOUNG T. TSE	Art Unit 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 8 to page 13, filed September 30, 2005, with respect to claims 1-13, 15, 17-20, 22, 24-30 and 32 have been fully considered and are persuasive. The rejection of claims 1-13, 15, 17-20, 22, 24-30 and 32 has been withdrawn.

Specification

2. The disclosure is objected to because of the following informalities: page 1, lines 5-7, the U.S. Provisional Application needs to be updated; page 2, line 2, "Beek")" should be "Beek"))"; page 4, line 4, the amendment to the specification filed September 30, 2005 by changing "FIG. 2" to "FIG.1" should be changed back to "FIG. 2".

Appropriate correction is required.

Claim Objections

3. Claims 10, 15-27 and 31 are objected to because of the following informalities: in line 2 of both claim 10 and claim 25, "max" should be "maximum"; in claim 15, line 5, "function" should be "function output"; in claim 16, line 5, "an estimate" should be "the estimate"; claims 17-21 are directly or indirectly depended upon claim 15; in claim 22, line 1, "delay spread" should be "delay-spread"; in claim 23, line 7, "an estimate" should be "the estimate"; the dependent claims 24 and 26-27 are directly or indirectly

depended upon claim 22; and in claim 31, line 3, "a cyclic" should be "the cyclic".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 8-14 and 22-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The configuration of claims 8 and 22 does not correspond to the disclosure of the drawing of Figure 6.

For example, claim 8 recites a system comprising a correlator (54) for computing an ensemble correlation function output from a plurality of received symbols; and a timing estimator, operatively coupled to the correlator, for determining a valid sampling region based on a width of a plateau of the ensemble correlation function output; and determining least one sampling position for at least one symbol based on the valid sampling region. However, according to the present invention shown in Figure 6 and discussed in the specification, it is unclear what element(s) shown in Figure 6 is the timing estimator for performing the function of claims 8 and 22. Note claims 9, 10, 11 and 14 further comprising a filter (56), a maximum detector (58), a comparator (60), and

at least on phase locked loop (62 or 64) which are not part of the timing estimator as recited in the claims. Clearly, as shown in Figure 6, the only element left for generating timing estimate is a choose sampling position (67) for selecting the output between the PLL (62) or the PLL (64) which does not perform any estimation function.

Similarly, claim 22 recites a system for estimating delay spread in a communication system using cyclic extension, comprising a correlator (54) for computing an ensemble correlation function output from a plurality of received symbols; and a delay-spread estimator, operatively coupled to the correlator, for estimating the delay-spread. However, according to the present invention shown in Figure 6 and discussed in the specification, it is unclear what element(s) shown in Figure 6 is the delay-spread estimator for performing the delay-spread estimation. Note claims 23, 24, and 25 further comprising a comparator (60), a subtractor (66), a filter (56), and a maximum detector (58) which are not part of the delay-spread estimator as recited in the claims. Clearly, as shown in Figure 6, no element is left for generating the delay-spread estimation.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-7 and 15-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The preamble of claim 1 recites a method for timing recovery in a communication system using cyclic extension. However, the body of the claim does not recite how to

perform the timing recovery or estimation using the cyclic extension in order to achieve the goal for timing recovery. Also see independent claims 15, 22 and 28.

In claim 7 (line 2), claim 16 (line 5), and claim 20 (line 2), the phrases “the threshold” and “the symbol” both lack antecedent basis.

Wherein claims 2-6, 17-19, 21, 23-27 and 29-32 depend upon claims 1, 15 and 22.

Allowable Subject Matter

8. Claims 1-7, 15-21 and 28-32 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

9. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to show or suggest the generation of an ensemble correlation function for timing estimation or delay-spread estimation, the ensemble correlation function is used to provide improved delay-spread and timing information by not combining together consecutive correlation values over the entire length of the cyclic extension and is obtained by combining consecutive correlation values over a window smaller than the length of the cyclic extension, and by combining correlation values for identical sample positions over an ensemble of OFDM symbols.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

EP 1 065 855 A1 is related to a communication apparatus for performing cross correlation to determine delay in the transmission channel and receiving a cyclic extension between two orthogonal frequency division multiplex to be transmitted.

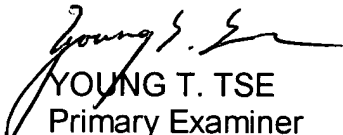
Laroia et al. is related to a method and apparatus for joint time and frequency synchronization for orthogonal frequency division multiplexing system.

Mizoguchi et al. is related to a radio packet communication receiver system using orthogonal multi-carrier modulation system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOUNG T. TSE whose telephone number is (571) 272-3051. The examiner can normally be reached on Monday-Thursday and alternative Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The Central FAX Number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


YOUNG T. TSE
Primary Examiner
Art Unit 2637